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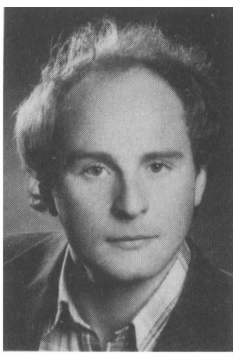
AUTHORS — APRIL 1978

LOW-TEMPERATURE NUCLEAR HEAT

ECONOMICS AND POTENTIAL USE OF LOW-TEMPERATURE NUCLEAR HEAT

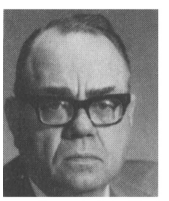
D. Oesterwind

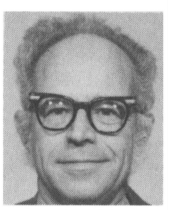


Dieter Oesterwind (doctor, nuclear engineering and economy, University of Cologne, 1975) works at the Jülich Nuclear Research Centre in the Department of Systems Analysis and Technological Development. His current interests are in analyses regarding technical and economic effects of light water reactors and high-temperature reactors in the industry and household sectors, in analyses about the fields of application of nuclear process heat in Brazil, and in steel making and extraction of oil from oil shale.

U.S. DEPARTMENT OF ENERGY PROGRAMS TO EVALUATE APPLICATIONS OF HEAT FROM NUCLEAR REACTORS

W. F. Savage
I. Spiewak

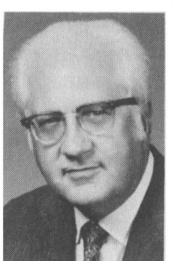




William F. Savage (top) (MS, engineering, Purdue University, 1949; graduate, Oak Ridge School of Reactor Technology, 1958) is chief of advanced concepts evaluation at the U.S. Department of Energy. He was associated with various private firms, including the General Electric Company and Martin-Marietta, prior to entering the government. At present, he is directing programs related to cogeneration, district heating, uses of waste heat, energy centers, and heat dissipation systems. **Irving Spiewak** (BS, chemical engineering, Cooper Union, 1947; MS, Massachusetts Institute of Technology, 1949) has been with the Reactor Division of Oak Ridge National Laboratory since that time and is head of the Engineering Analysis Department. He has been active in evaluating and developing new uses for nuclear energy, including seawater desalination and industrial steam and process heat. His organization has recently completed a U.S. Atomic Energy Commission sponsored assessment of industrial energy options based on coal and nuclear systems.

A SUMMARY OF U.S. ACTIVITIES IN LOW-TEMPERATURE REJECT HEAT UTILIZATION

Warren F. Witzig
David R. DeWalle



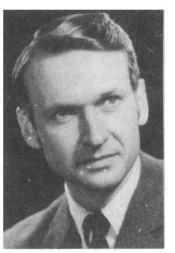
Warren F. Witzig (right) (BS, electrical engineering, Rensselaer Polytechnic Institute, 1942; MS, electrical engineering, 1944; PhD, physics, University of Pittsburgh, 1952) is currently professor and head of the Nuclear Engineering Department at The Pennsylvania State University. His special interests include fuel management, reactor design, nuclear safety and licensing, and environmental problems associated with radiation waste

and thermal effects. **David R. DeWalle** (BS, forestry, University of Missouri, 1964; MS, forest hydrology, University of Missouri, 1966; PhD, watershed management, Colorado State University, 1969) is associate professor with the School of Forest Resources and Institute for Research on Land and Water Resources at The Pennsylvania State University. His research interests include waste heat dissipation using soil warming, thermal pollution of streams, and energy budgets of natural and disturbed ecosystems.

HEAT EXTRACTION FROM NUCLEAR POWER PLANTS

Gerhard Deuster
Peter Zenker

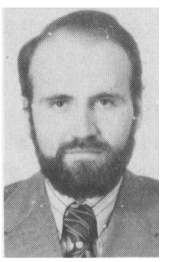
Gerhard Deuster (top) (mechanical and economical engineer, diploma-certificate, Technical University of Darmstadt, 1954; graduation to Honorary Mechanical Doctor, Technical University of Hannover, 1975) is chairman of the board of Energieversorgung Oberhausen AG, president of the Nuclear Committee of UNICHAL, a member of Project-Committee High-Temperature Reactor of the Ministry for Research and Technology of the Federal Republic of Germany, and a member of the closed-cycles committee of ASME. He works in the field of integrated heat and power production. **Peter Zenker** (Dr. Ing., mechanical engineering, Technical University of Munich, 1965) did postgraduate work at the Institute of Thermal Power Plants, University of Munich, on steam boilers and on two-phase turbulent motion. In 1971, he joined Energieversorgung Oberhausen AG, a company producing and distributing electricity, gas, and heat. During the past few years, he has worked on integrated energy systems.



THE OPTIMIZATION PROBLEMS IN A LARGE NUCLEAR HEAT-AND-POWER PLANT CONNECTED TO A DEVELOPING DISTRICT HEATING SYSTEM

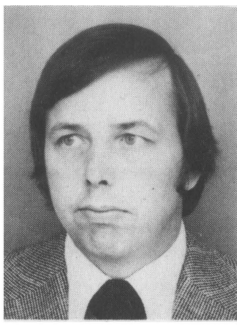
Jacek Marecki
Rudolf Krajewski
Andrzej Reński

Jacek Marecki (top) (ME, electrical engineering, Technical University of Gdańsk, 1954; Postgraduate Diploma, nuclear power engineering, Royal College of Science and Technology, Glasgow, 1959; Dr., power engineering, Technical University of Gdańsk, 1961; Professor, 1971) has been director of the Electrical Power Engineering and Automation Institute since 1974. His interests include optimization problems of electrical power systems, district heating systems, and nuclear power plants. His major book concerning the combined generation of heat and electrical energy was published in Poland in 1973. He is a member of the Committee on Energy Problems of the Polish Academy of Sciences. **Rudolf Krajewski** (center) (ME, mechanical engineering, Technical University of Gdańsk, 1950; Dr., power engineering, 1972) has been a lecturer at the Technical University of Gdańsk since 1965. His early interests included heat and power engineering problems connected to the industrial and municipal buildings. At present, he is working in the area of thermohydraulics of nuclear reactor cores. His current interests also include the problems of the choice of heat cycle schemes for the heating systems with fossil and nuclear heat-and-power plants. **Andrzej Reński** (bottom) (ME, nuclear engineering, Technical University of Warsaw, 1969) has been working at the Technical University of Gdańsk since 1970. His early interest was centered in heat exchange in power and nuclear engineering. His current interests include dynamics problems of nuclear power plant heat cycles and recently optimization problems of nuclear heat-and-power schemes.



DISTRICT HEATING IN GREATER STOCKHOLM

Lars Jäderberg



Lars Jäderberg (MEng, mechanical engineering, The Lund Institute of Technology, University of Lund, Sweden, 1970) is head of the district heating planning department of Stockholms Energiverk. As a member of an intermunicipal expert group regarding energy matters, he is to a great extent involved in the intermunicipal planning of the energy supply systems in the region, particularly regarding district heating.

INVESTIGATIONS CONCERNING NUCLEAR ENERGY IN THE COMBINED PRODUCTION OF ELECTRICITY AND HEAT IN THE HELSINKI METROPOLITAN AREA

M. Aho
H. Hüdenpalo
M. Seppä
O. J. A. Tiainen
L. Nevanlinna
R. Perander

No photographs or biographies available.

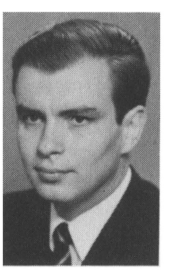
A DUPLEX CHEMICAL SYSTEM FOR THE STORAGE AND CONTAINER TRANSPORT OF HEAT FOR DISTRICT HEATING

M. Taube

Mieczyslaw Taube (MS, physical chemistry, Polytechnic Institute of Warsaw, 1947; Doctor Math-Phys-Sci, Polish Academy of Sciences, 1959) was associate professor and head of the Radiochemical Laboratory at the University of Warsaw until 1968. Since then, he has been head of the Research Group at the Swiss Federal Institute of Reactor Research at Würenlingen. His current interests include the molten salt (chloride) fast breeder reactor and the use of salt-amine systems for transport, storage, transformation, and heat pumping.

MULTI-STAGE-FLASH DESALINATION PLANTS OF RELATIVE SMALL PERFORMANCE WITH INTEGRATED PRESSURIZED WATER REACTORS AS A NUCLEAR HEAT SOURCE

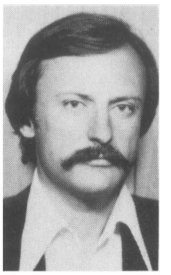
Gerhard Petersen
Michael Peltzer

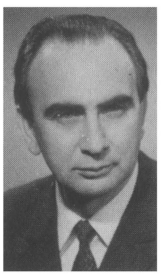


Gerhard Petersen (top) (Ing., grad., mechanical engineering, Fachhochschule Hamburg, Germany, 1965) worked at the Design Department of the Company for Utilization of Nuclear Energy in Shipbuilding and Navigation Ltd. (GKSS) in Geesthacht near Hamburg from 1965 to 1971 in the area of design of nuclear research facilities. Since 1972, he has been a member of the Physical Department at GKSS and has performed feasibility studies on nuclear desalination. His present field of activity is the development of calculation methods for thermal discharges into large bodies of water. **Michael Peltzer** (engineering of physics, Physical-Technical Engineering School of Hamburg, Germany, 1967) was a member of the Institute of Physics of GKSS and was engaged for some years in nuclear fuel cycle economics. At present, he is working at the Department of Planning and Coordination at GKSS and has an interest centered in economic studies for research and development projects.

MEASURES TO ENSURE THE POSSIBILITY OF FUTURE HEAT SUPPLY FROM THE KAISERAUGST NUCLEAR POWER STATION

Janos Fazekas
Mirko Mamuzic

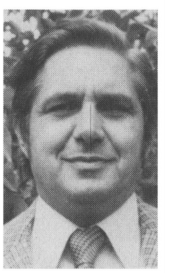




Janos Fazekas (top) (Dipl. Ing., mechanical/nuclear engineering, Federal Institute for Technology, Zurich, Switzerland, 1964) has been with Motor Columbus Consulting Engineers since 1966. He is presently a member of the project management team of the Kaiseraugst Nuclear Power Station. His current interests include safety, licensing, and heat utilization. **Mirko Mamuzic** (Dipl. Ing., mechanical engineering, University of Zagreb, 1961) first worked on district heating problems at Elektroprojekt Consulting Engineers in Zagreb, Yugoslavia, and then in the Thermal Department of Large Turbogroups of Brown Boveri & Cie, Switzerland. Since 1973, he has been at Motor Columbus Consulting Engineers Ltd., Switzerland, and has been working on various nuclear power plant projects. His main interest include feedwater heating, cooling water, and district problems.

SOIL WARMING FOR UTILIZATION AND DISSIPATION OF WASTE HEAT IN PENNSYLVANIA

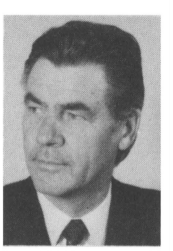
David R. DeWalle
Andrew M. Chapura, Jr.

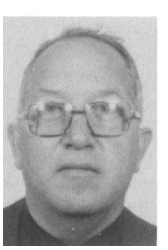


David R. DeWalle (top) (BS, forestry, University of Missouri, 1964; MS, forest hydrology, University of Missouri, 1966; PhD, watershed management, Colorado State University, 1969) is an associate professor with the School of Forest Resources and the Institute for Research on Land and Water Resources at The Pennsylvania State University. His research interests include waste heat dissipation using soil warming, and he has served as technical coordinator of the soil warming research project at Penn State since 1972. **Andrew M. Chapura, Jr.** (BS, forest science, The Pennsylvania State University, 1975; MS, forest hydrology, The Pennsylvania State University, 1978) served as a research assistant with the Institute for Research on Land and Water Resources at The Pennsylvania State University. His research interests include vegetation influences on soil surface temperature of a soil warming system, and he supervised the operation and maintenance of the soil warming resarch project at Penn State from June 1975 to December 1976.

EXPERIENCE GAINED IN FRANCE ON HEAT RECOVERY FROM NUCLEAR PLANTS FOR AGRICULTURE AND PISCICULTURE

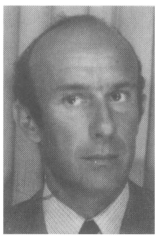
P. Balligand
P. Le Gouellec
M. Dumont
A. Grauby





P. Balligand (top right) (polytechnic school, 1937; naval officer, submariner) has been with the French Atomic Energy Commission as head of the Experimental Reactors Department of Saclay, and has been deputy director general of the International Atomic Energy Agency at Vienna, deputy director of the Nuclear Research Center of Grenoble, delegate to programs of general interest, and general inspector for diversification. His specialties include experimental reactors, electricity, and mechanics. **P. Le Gouellec** (bottom left) (Naval School, 1942; naval officer, electronics) was with the French Atomic Energy Commission as assistant to the head of the Programs Department. Later he was assistant to the delegate to programs of general interest and to the general inspector for diversification. His

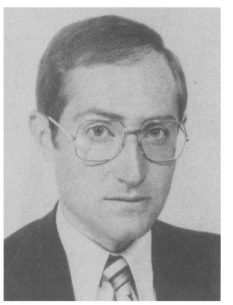
specialty is research management. **M. Dumont** (top right) (graduate engineer, Institute of Chimie Physique Industrielle of LYON) has been an engineer since 1964 in the Department of Thermic Conversion of the Commissariat à l'Energie Atomique in the Grenoble Nuclear Center. His specialities are energy saving and recovery of thermic wastes. **A. Grauby** (bottom left) joined the French Atomic Energy Commission in 1956 as head of the Radioecology Laboratory at the Cadarache Nuclear Research Center. He proposed as early as 1960 the recovery of the thermic wastes of a nuclear plant and won a prize of the Academy of Sciences for his scientific work. His specialties include radioecology and radioprotection.



FRONT HEAT EXTRACTION

Ph. Aussourd

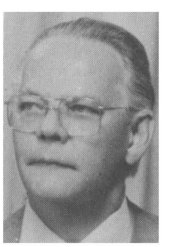
Philippe Aussourd (Ecole Polytechnique, 1963; Ecole Nationale des Ponts et Chaussées, 1968) is manager of the department in charge of Site Selection, Environmental Studies, and Public Information at Electricité de France, the French national electric power utility. He was formerly a civil officer in the Ministry of Industry, where he was mainly involved in nuclear safety.



DISTRICT HEATING FROM NUCLEAR POWER PLANTS

J. Bogen
K.-H. Schüller

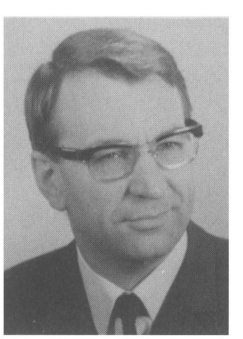
Jochem Bogen (top) (Dr. rer. nat, physicist, University of Heidelberg) worked in the fields of envionmental radiation monitoring, atmospheric transport problems, and trace element analysis until 1972. Thereafter, he collected practical experience in the field of radiation protection and security questions for nuclear plants in the Karlsruhe Nuclear Research Center. Since 1974, he has been with Brown, Boveri & Cie AG, Mannheim, engaged in the planning and implementation of nuclear power plants as project manager. He has been engaged in special projects for low-temperature and process heat generation from high-temperature gas-cooled reactor and pressurized water reactor (PWR) systems. His present interest is in the field of engineered nuclear fuel storage for power stations. **K.-H. Schüller** (School of Engineering Beuth, Berlin, 1945) has acted as project engineer for thermal power plants with Brown, Boveri & Cie AG since 1955. He is head of the department for thermodynamic calculations and economic questions for power plants. He has vast experience in power plant process optimization with respect to availability and economy of the total plant. He was engaged in several studies using nuclear power plants of the PWR and high-temperature reactor types for heat generation in the low- and high-temperature range.



STEAM TURBINES FOR DISTRICT HEATING IN NUCLEAR POWER PLANTS

Helmut J. Mühlhäuser

Helmut J. Mühlhäuser (Dipl. Ing., mechanical engineering, Technische Hochschule in Darmstadt, Germany, 1958) is head of tender calculation for large steam turbines at Brown, Boveri & Co. Ltd. in Baden, Switzerland, and is also responsible for thermal layout and cost calculation. His current interests include the application of steam turbines for improving environmental protection.



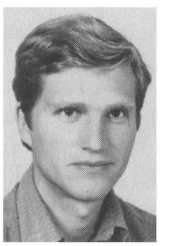
NUCLEAR STEAM TURBINES FOR POWER PRODUCTION IN COMBINATION WITH DISTRICT HEATING AND DESALINATION

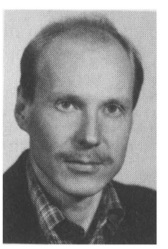
Bjarne Frilund
Knud Knudsen

Bjarne Frilund (top) (MS, electrical engineering, Technical University of Helsinki, 1953) was superintendent of an industrial power station in Finland until 1958, when he became employed at STAL-LAVAL Turbin AB as a project engineer for large steam turbine plants. He has been sales manager since 1966. **Knud Knudsen** (MS, mechanical engineering, Denmark Technical University, 1963) has been employed at STAL-LAVAL Turbin AB since 1965. He is now chief designer in the Large Steam Turbine Design Department.

SAFETY EVALUATION OF THE SECURE NUCLEAR DISTRICT HEATING PLANT

Jean-Pierre Bento
Tuomas Mankamo

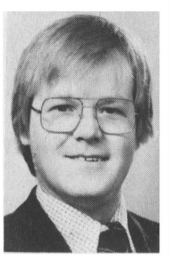


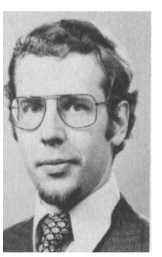


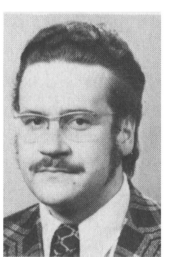
Jean-Pierre Bento (top) (BS, physics, Sorbonne University, Paris, 1969; ME, nuclear engineering, Chalmers University of Technology, Gothenburg, 1972) joined the Department of Safety at AB Atomenergi in Studsvik after two years at the Chalmers Department of Neutron Physics. Involved in reactor safety analysis, his fields of interest are core accident analysis and assessment of related safety systems. **Tuomas Mankamo** (MS, technical physics, Technical University of Helsinki, Finland, 1970) is working in the Reliability Group of the Technical Research Centre of Finland in the Electrical Engineering Laboratory. Formerly a research engineer, he was nominated group manager in October 1977. His recent activities have concentrated on reliability analyses for nuclear plant safety systems and transportation risk studies for hazardous liquids. Basic studies on common cause failures are one of his current interests.

RISK ASSESSMENT OF URBAN-SITED HEATING REACTORS

I. Savolainen
R. Tarjanne
S. Vuori



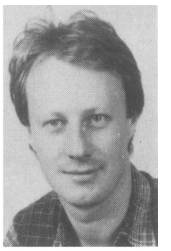


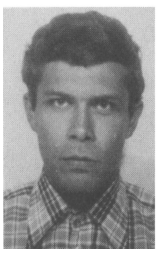


Ilkka Savolainen (top) (Dipl. Eng., Helsinki University of Technology, 1974) has interests centered in reactor risk studies. He has worked at the Technical Research Centre of Finland in the Nuclear Engineering Laboratory since 1973, and his special field is assessment models for consequences of radioactive releases, dose and contamination calculations, and atmospheric dispersion of radioactive material. **Risto Tarjanne** (center) (Dip. Eng., 1969; Licentiate of Technology, Helsinki University of Technology, 1975; Doctor of Technology, Helsinki University of Technology, 1977) works at the Nuclear Engineering Laboratory of the Technical Research Centre of Finland, conducting research on technical and economical feasibility of small single-purpose heating reactors and on safety and siting of nuclear reactors. At present, he is an associate professor of nuclear engineering at Lappeenranta University of Technology. **Seppo Vuori** (bottom) (Dipl. Eng., 1971; Licentiate of Technology, Helsinki University of Technology, 1976) is presently employed by the Nuclear Engineering Laboratory of the Technical Research Centre of Finland. His first experience included the assessment of technical and economical feasibility of small reactors for district heating. At present, his primary interest is the safety of nuclear power plants and especially the environmental impacts caused by the nuclear fuel cycle.

CORE DESIGN AND DYNAMICS OF THE SECURE DISTRICT HEATING REACTOR

Hans Gransell
R. Höglund





P. Hans Gransell (top) (MEng, nuclear engineering, Royal Institute of Technology, Sweden, 1974) is a research engineer at the Section for Core Analysis, AB Atomenergi, Studsvik. His interests include safety analysis and application of safety computer codes to light water reactors. **Randolph K. O. Höglund** (MEng, nuclear engineering, Helsinki University of Technology, Finland, 1973) is a research engineer at the Nuclear Engineering Laboratory of the Technical Research Centre of Finland. His interests include the development of computer codes for nuclear reactor analysis, resonance integral, fuel design, and fuel cycle problems.